Systems Approaches for Assessing Wildlife Responses to Pesticides, Zoonotic Disease, and Other Interacting Stressors

CSS Task 2.4.1
SHC Task 2.2.1

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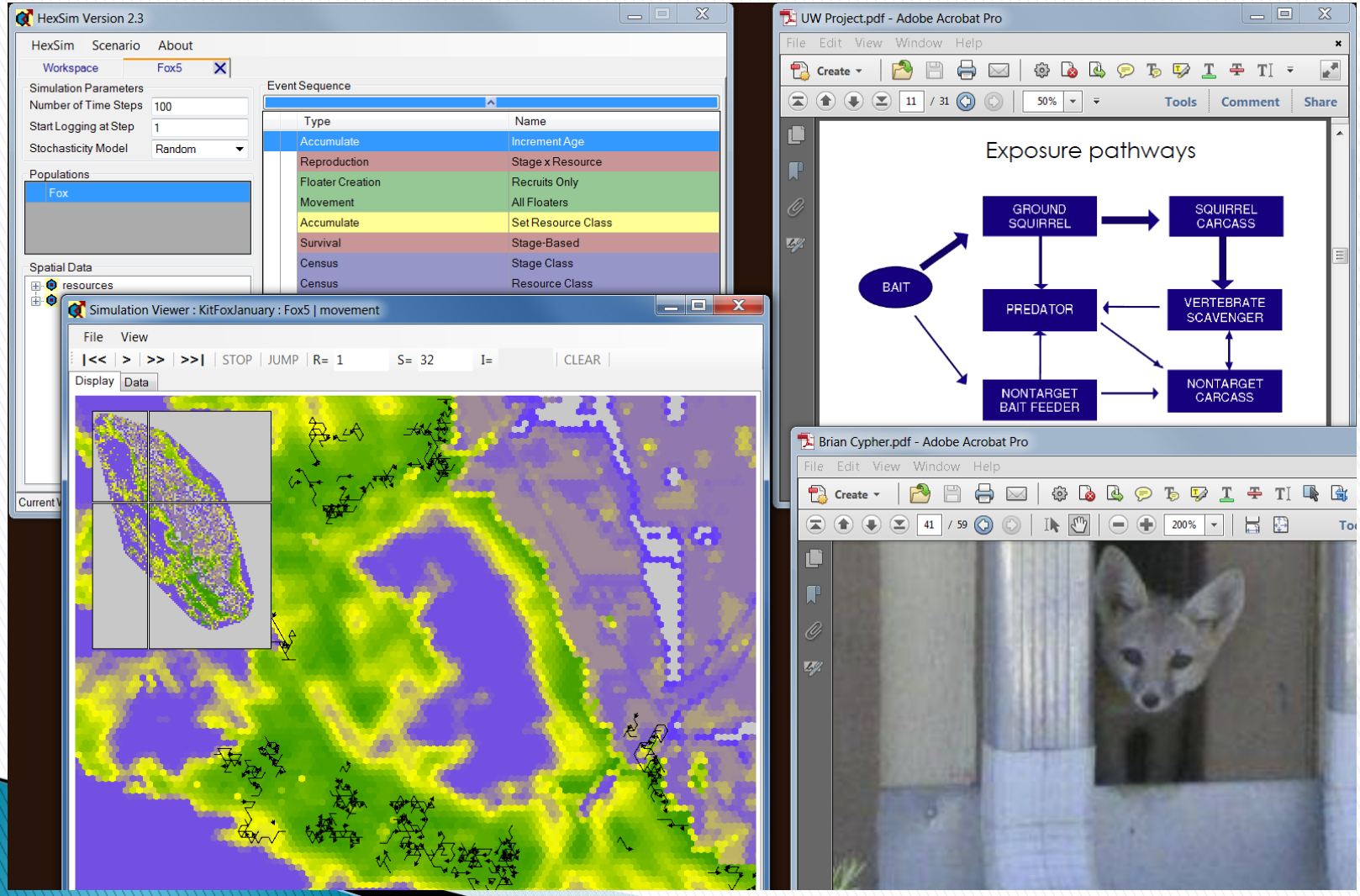
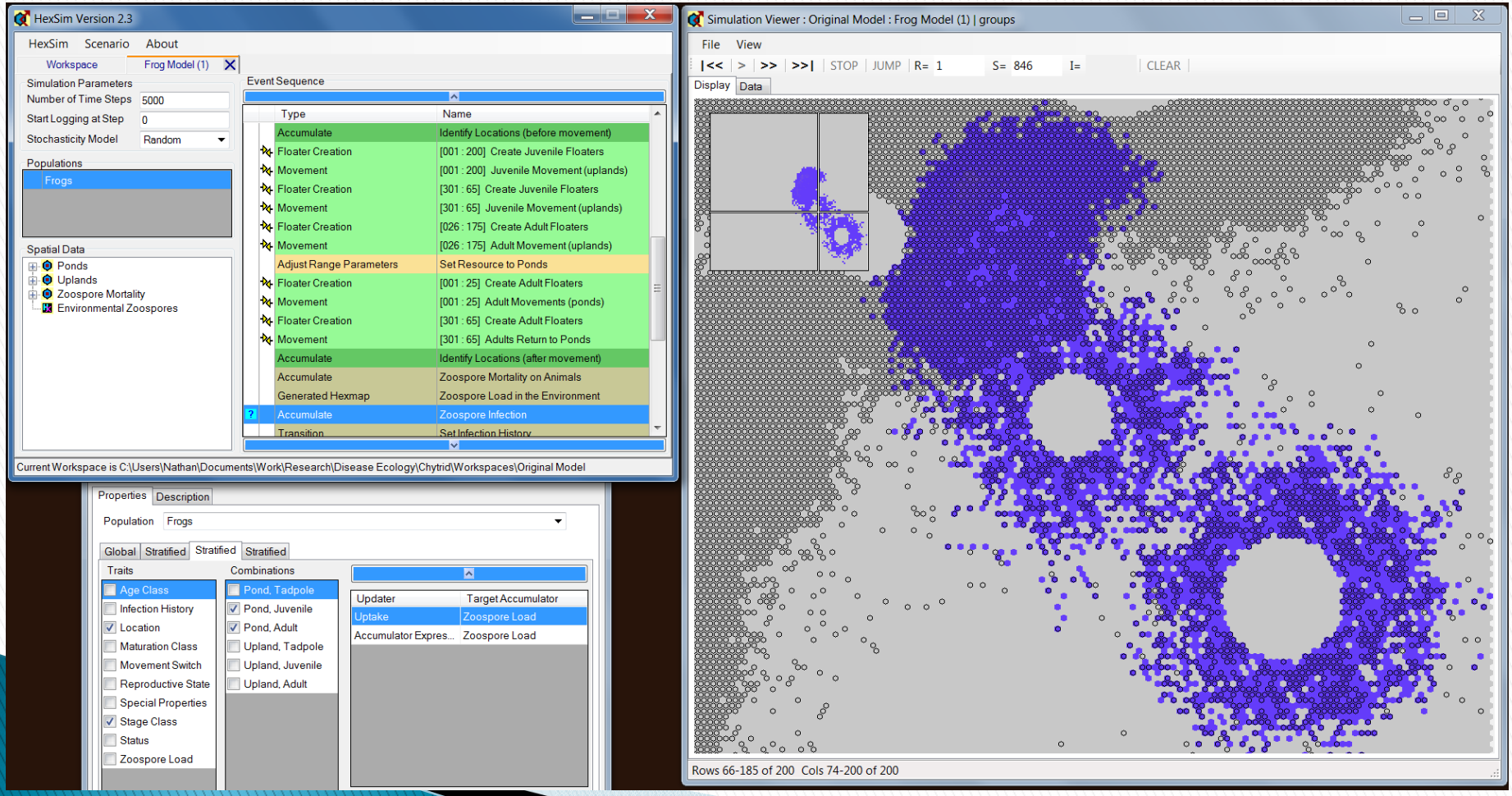
Problem identification and decision framework

- EPA regulates many pesticides that impact threatened and endangered organisms, yet has no way of evaluating off-target effects at landscape and population scales.
- Staff in the pesticide programs need a scientific framework for identifying the likely population-level consequences of pesticide use on off-target species, and actions they might take to mitigate such adverse effects.

We are developing applied models including a dynamic kit fox simulation that includes pesticides, predators, and other stressors.



We are also constructing models of disease spread in wildlife populations, including a frog / chytrid model (shown). Future work will focus on disease spread to other species, and address human health concerns.



Our products will include:

Spatially-explicit population models that characterize exposures and link ecological effects to stressor interactions for species with varying life history strategies.

- Models and proof of concept case studies (including the kit fox, frog, and black-footed ferret / prairie dog systems)
- Illustrations showing how models can be used to evaluate the impacts pesticides are having on off-target species at landscape and population scales.
- Mechanistic simulations tracking the spread of zoonotic diseases through wildlife populations.
- Illustrations linking zoonotic disease spread to other stressors (e.g. pesticide use) with a focus on human health endpoints.